Mr. William J. Larkin May 7, 1993 Page Two

After you and the Geryks have reviewed the enclosed information, it might be helpful to have it reviewed by your environmental consultant and Mrs. Geryk's physician. I would be very interested to learn their opinion of these findings.

Sincerely yours,

PHIFER WIRE PRODUCTS, INC.

Charles Morgan
Charles Morgan

CM:jh

Enclosures

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August 26, 1992

Mr. John Marcaccio, President Velux America P.O. Box 5001 Greenwood SC 20648

Dear Mr. Marcaccio,

I would like to alert you to a possible health hazard associated with one of your products.

The screen that we received (three years ago) with our four VS#4 skylights is apparently coated with some material that breaks down after several year's exposure to sunlight, releasing a noxious smelling odor. We are now trying to find out from your technical people what the coating is, to see if breathing it is a health hazard.

We had this mysterious odor all summer on our bedroom and study, which have four of your skylights, and finally, after having several professional contractors and the local health department out to try to locate it – traced it to the screens. They themselves smelled, and, once removed from the room, the odor disappeared.

Your representative kindly offered to replace the screens, but it is crucial that the new ones do not have the same plastic treatment as the old ones.

In addition, our health department has asked us to find out the chemical name of the plastic used, so that it can ascertain what gas the screen coating released. (We have checked our other, vertical window screens, and none of these have any coating or smell.)

Thank you very much for your concern for your otherwise fine product, and for your attention to this matter. Looking forward to hearing from you at your earliest convenience. (We are at 914-634-2850 until September 8.)

Sincerely,

Jean Richards

cc. Carl Dornbush, Clarkstown Health Department

a9

Jean Richard

Please reply to: FAX # 205/759-4450

FACSIMILE CORRESPONDENCE

To:

\

Ms. Jean Richards

Fax No. 212/674-3016

Date: 9/14/92

From:

Charles Morgan

No. of Pages: 14

Dear Ms. Richards:

The following 13 pages is a report from our toxicologist, Dr. Robert G. Meeks, addressed to our Quality Control Engineer, Anthony Gambel. Dr. Meeks performed indepth analysis of odors emitted by fiberglass insect screening that I believe was identical to the screening installed in your home. Dr. Meeks' report is fairly technical, but we were pleased to see that he concludes that "since these are all irritant effects it is to be expected that once the offending agent was removed, then these symptoms should reverse themselves and health status should revert back to normal" and "that chronic or long-term effects resulting from exposure to these agents is not to be expected."

If you have any questions regarding our material or this report, please feel free to call me or Dr. Meeks directly. My toll free number is 800-633-5955. Dr. Meeks' direct line telephone number is 205/934-7204.

We hope you will be completely satisfied with the aluminum screens that Velux is going to use to replace your fiberglass screens.

Sincerely yours,

PHIFER WIRE PRODUCTS, INC.

Charles Morgan
Charles Morgan

CM:jh

96

Mr. Charles Morgan
Executive Vice President
Phifer Wire Products
P.O. Box 1700
Tuscaloosa, Alabama 35403-1700

Dear Mr. Morgan:

I am writing to inform you that my family lives in a home in which, unfortunately, your toxic window screens were installed. I first learned of the possibility of having dangerous screens last summer from a neighbor who, like others in our subdivision, learned that she had toxic screens in her home. She apparently didn't make this discovery before experiencing unusual illnesses in her family. I regret having to inform you that our family appears to be no exception.

I am appalled to think that your company has been aware of potentially harmful emissions from your product and did not issue a recall or attempt to notify consumers. My neighbor told me that Weathervane was handling replacements if they could verify that the screens installed were, in fact, toxic. I called Weathervane many times over a several month period. They were unable to locate records needed to verify which screens we had. Finally I went to my local township to get our builders names and year of record. When I called to give this information to Weathervane they called back shortly after that to tell us we would have new screens in about 2 weeks. The screens were replaced earlier this month. I am still waiting to be told by Weathervane who manufactured our current screens. I have detected a "hot electrical wire" odor in one room since our new screens were put in, so I am curious about the safety of these replacements.

Since moving into this home my children have experienced a number of allergy symptoms both in the mornings and evenings. There have been many mornings when we thought the children had colds, but they didn't have such a problem with the sneezing, sniffling and itching when they were away from home throughout the day. My husband has had itchy and burning eyes on several occasions. He has also noticed an increase in gastrointestinal upsets. Some of the children's allergy symptoms seem to have improved since the screens were changed, but we haven't noticed a marked change in any other problems to date.

I have had the majority of the health problems in the family since living here. My sinus problems were getting worse and were somewhat improved after surgery in February 1991. I became ill with what is believed to be a rheumatic illness which affects joints, muscles the central nervous system, as well as other systems. None of these were previous ailments. I have been on a medical leave from my teaching job since June, 1991. I have had an increasing problem with intermittent skin rashes and other skin abnormalities on my face and body. I have developed eczema on my hands in recent months as well. My doctor has referred me to Mayo Clinic. My first appointment is in December for an evaluation of my condition. I will be submitting a

copy of toxicology reports on your screens to my doctor as well as those at Mayo Clinic. Perhaps they can help determine the adverse effects your screens can have on humans.

I am requesting any current toxicology data you have gathered on the screens as soon as possible. I am also requesting a guarantee that the screens I currently have are non-toxic. If you cannot provide us with the latter, perhaps Weathervane will be able to assist me. Your prompt response will be appreciated. You may expect further contact in the near future.

Thank you,

6600 Sun Valley Drive

Clarkston, MI 48348

1-313-391-4434



PHIFER WIRE PRODUCTS, INC.

P. O. BOX 1700 . TUSCALOOSA, ALABAMA 35403-1700 U.S.A.

■ CHARLES E. MORGAN
Executive Vice President and Corporate Counsel

November 3, 1992

Ms. Diane Mazze 281 Fox Run Road Exton, PA 19341

VIA EXPRESS MAIL

Dear Ms. Mazze:

As I mentioned to you in our telephone conversation yesterday, we had an indepth study done of the odors emitted by our fiberglass insect screening. This research was conducted by the leading toxicologist in this state, Dr. Robert G. Meeks of the University of Alabama/Birmingham School of Public Health. A complete copy of Dr. Meeks' report is enclosed.

Dr. Meeks report is fairly technical, but we were pleased to see that he concludes that "since these are all irritant effects it is to be expected that once the offending agent was removed, then these symptoms should reverse themselves and the health status should revert back to normal" and "that chronic or long-term effects resulting from exposure to these agents is not to be expected."

I spoke with our chemical engineer, Shawn Winters, and with our textile engineer, Johnny Skinner, regarding your telephone call. They both assured me that, to the best of their knowledge, our product contains absolutely no formaldehyde. They provided me with a copy of our "material safety data sheet" on this product, which I have enclosed with this letter. You will note that the enclosed sheet does not contain a complete list of the ingredients of this product. We know that we have added no formaldehyde to this product, but I want to be absolutely certain and be able to prove to you that our ingredient suppliers have not included any formaldehyde in those ingredients they supply to us. Our engineers have, on various occasions, reviewed the material safety data sheets from our suppliers and have found no mention of formaldehyde in any of those ingredients. I am in the process of collecting copies of current material safety data sheets from all our suppliers who supply ingredients that go into our fiberglass insect screening. Once I have accumulated all of those data sheets and have verified that they are all current and accurate, I will send you copies of them.

In the meantime, if you have any questions and would like to discuss this further please feel free to call me, Shawn Winters or Johnny Skinner at our toll free number (800-633-5955). If you would like to discuss this study directly with Dr. Meeks or you have a technical consultant or environ-

Personal T August Ecologie

Founded 1952 By REESE PHIFER

Ms. Diane Mazze November 3, 1992 Page Two

mental expert who would like to discuss this with Dr. Meeks, please feel free to call him directly at 205/934-7205.

Sincerely yours,

PHIFER WIRE PRODUCTS, INC.

Charles Morgan
Charles Morgan

CM:jh

Enclosures



Suntrol Window Products, Inc.

3767 East Broadway Road, Suite 6 / Phoenix. Arizona 85040 **602 / 437-4431**

November 4, 1992

Mr. Charles E. Morgan
Executive Vice President
Phifer Wire Products, Inc.
P. O. Box 1700
Tuscaloosa, Alabama 35403 - 1700

Dear Charles:

Enclosed please find a letter from Ms. Gertrude Kamuda as well as my response. Ms. Kamuda is an elderly woman who is convinced that she was made sick by her <u>new</u> SunScreens.

Jerry Liveoak has made contact with Ms. Kamuda and may be able to provide you with some insight as to what you are dealing with in Gertrude Kamuda. Although I think that she sincerely believes she was made sick by her SunScreen, she also tends to hear what she would like to hear or what is controversial; the enclosure speaks for itself.

If you would like more information regarding Ms. Kamuda please do not hesitate to call me, otherwise I will keep you informed if she continues to aggress.

Sincerely,

John N. Edwards

President



Suntrol Window Products, Inc.

3767 East Broadway Road, Suite 6 / Phoenix, Arizona 85040 **602 / 437-4431**

November 4, 1992

Ms. Gertrude Kamuda 8625 E. Bellview #1115 Scottsdale, Arizona 85257

Dear Gertrude:

I am writing in response to your most recent letter regarding Phifer SunScreen and have enclosed a copy of the report produced by Dr. Crutchfield that you requested.

Gertrude, I too am worried about any health problems that you and your daughter may have experienced due to SunScreen exposure. That's why I contacted you personally and offered to share information with you and your doctors. However, I am confused over your characterization of our conversation. I am not familiar with any report produced in Colorado nor do I remember telling you "that Phifer company covered up a lot things and that they fibbed to you (me)"; it is true that we initiated the first report on the volatile emissions of SunScreen. Phifer did not warn us about any potential health problems associated with screening because they where not aware of the problem at that time. According to Mr. Charles Morgan with the Phifer Company, Suntrol was the first to report any physical side effects; since they did not know about the illnesses there really was nothing for them to try and cover up. I personally have been doing business with the Phifer Wire Company for over ten years and have made several trips to their facility in Tuscaloosa Alabama. I have also had the opportunity to meet with upper management at Phifer and I can assure you that they would not condone or tolerate a "cover up".

Gertrude, when considering the Suntrol employees that experienced side effects due to volatile SunScreen emissions, I think it is important to keep in mind that we were exposed to hundreds of thousands of square feet of the material in an enclosed environment for more than two years. This is not to say that you and your daughter could not have been disturbed by the product, but I think it is important to keep things in perspective and so I emphasize the quantity of product that we came in contact with.

As of this writing I have not heard from either of your doctors, but would be more than happy to share what information I have with them, should they decide to contact me.

Ms. Gertrude Kamuda November 4, 1992 Page - 2

Gertrude, I hope that you are feeling better now that your screens have been replaced. If you have any more problems please do not hesitate to contact me at 437-4431.

Sincerely,

John N. Edwards

Chr Eleverd

President

October 27, 1992

Dear Mr. Edwards,

Please send me the reports you promised me. When I spoke to you at the Red Robin you told me you had a report from Colorado that you had conducted at your expense. And you told me it came back and said that the Phifer company covered up a lot of things and that they fibbed to you, and you found out on your own that you and your employees got very ill.

Since you called me today, I now know of a Tucson report. Please send me both the Colorado and Tucson reports.

I am very worried about any problems these screens caused us.

Sincerely,

(justineuk. Hanned)

y



P. O. BOX 1700 • TUSCALOOSA, ALABAMA 35403-1700 U.S.A.

■ CHARLES E. MORGAN **Executive Vice President and Corporate Counsel** November 30, 1992

Mrs. Claudia Fullerton 6859 Tanglewood Waterford, MI 48327

Via Express Mail

Dear Mrs. Fullerton:

I am sorry about the problem you have had with your fiberglass insect screening that was manufactured by Phifer Wire Products. I have spoken with Ms. Jan Stamper, service representative for Weathervane Window, Inc. and they are ready to replace all of the screening in your home, at your convenience and free of charge, with aluminum screening. Please call Ms. Stamper and set up a time for the new screening to be installed. Weathervane's telephone number is 313/227-4900.

I have enclosed a complete copy of a report written by Dr. Robert G. Meeks summarizing the research he did on the odors emitted by our fiberglass insect screening identical to that contained in the windows in your home that were provided by Weathervane. Dr. Meeks' report is rather techinical, but we were pleased to see that his narrative concludes by finding that "since these are all irritant effects it is to be expected that once the offending agent was removed, then these symptoms should reverse themselves and the health status should revert back to normal." Immediately following that, he writes "it is important to stress that chronic or long-term effects resulting from exposure to these agents is not to be expected."

The laboratory research on these odors was conducted by a completely independent group of toxicologists at the University of Alabama medical facility in Birmingham. Although Dr. Meeks is no longer under contract with us, he told me that he would be happy to discuss this report with you or with your physician or environmental consultant. Dr. Meeks is now Manager of Toxicology (responsible for toxicology testing worldwide) with the Dow-Corning Corporation of Midland, Michigan. His telephone number is 517/496-8629.

Sincerely yours,

PHIFER WIRE PRODUCTS, INC.

Pharles Morgan

Charles Morgan

Enclosure

cc: Ms. Jan Stamper

Weathervane Window, Inc.

Founded 1952 By REESE PHIFER

PHONE 205/345-2120 • FAX 205/759-4450 • TELEX 261326 (PHIF UR)



■ BEVERLY C. PHIFER, President

December 8, 1992

Mrs. Mary Golarz 6710 Sun Valley Drive Clarkston, MI 48348

Dear Mrs. Golarz:

I am sorry I was not in when you called yesterday. I want you to know that the entire Phifer Wire staff, including myself and my sisters, are very concerned about your health problems. Charles Morgan has kept us informed of your situation since you first contacted us last May. Charles is also very concerned and we hope we can all work together to help you identify the exact cause of your medical problems so that they can be resolved.

Our family has been in the screening business since 1952 and, until this past year, we have never had any customers experience reactions to any of our products. I don't know if that fact will be much comfort to you since you have experienced some great discomfort which may have resulted from the odors coming from our screening.

I was greatly relieved to read in Dr. Meeks' report that any allergic symptoms resulting from exposure to those odors should not be permanent but should disappear as soon as the product is removed from the home. We asked the folks at Weathervane to replace all of your screening, at our expense, and we understand that you had aluminum screening installed in September. I hope the symptoms you experienced with the fiberglass screening have all gone away since September. If not, we will certainly investigate further.

If you will send us a description of the symptoms you are experiencing along with a sample of the screening that was previously installed in your house, we will have it analyzed by our toxicologist and evaluated by a medical doctor at the University of Alabama at Birmingham.

Sincerely yours,

Beverly Phife.
Beverly J. Phifer

BCP:jh

T PHONE 205 345-2120 • FAX 205 759-4450 • TELEX 261326 (PHIF UR)

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Donnelly W. Hadden

ATTORNEY AND COUNSELOR AT LAW

301 East Liberty Street / Suite 585 / Ann Arbor, Michigan 48104 / (313) 741-5050

April 28, 1993

Phifer Wire Products, Inc. Box 1700 Tuscaloosa, Alabama 35403-1700

Attention: Mr. Charles Morgan

Dear Mr. Morgan:

Please be advised that Mr. Donald P. Unwin, Attorney at Law of 6850 Brookshire Drive, West Bloomfield Township, Michigan 48322-2728, and my firm have been retained by Mrs. Claudia Fullerton of 6859 Tanglewood, Waterford, Michigan with respect to her claim for damages resulting from exposure to organic compounds volatilized from screening material manufactured by Phifer Wire Products, Inc. and sold to Weathervane Window, Inc. and installed on her home.

As a result of this exposure, Mrs. Fullerton has sustained sickness, medical expenses and impairment of earning capacity. She seeks compensation for these items as well as for her non-economic damages.

You may consider this notice of our attorneys' lien on any proceeds of this claim. If you or your insurer would like to discuss disposition of this matter without litigation, please contact me at your earliest convenience.

inc**e**rely

Donnelly W. Hadden

DWH/gg

cc: Home Insurance Company



PHIFER WIRE PRODUCTS, INC.

P. O. BOX 1700 . TUSCALOOSA, ALABAMA 35403-1700 U.S.A.

CHARLES E. MORGAN
 Executive Vice President and Corporate Counsel

June 2, 1993

Mr. Walter Gary Pritchett-Moore, Inc. P. O. Box 2086 Tuscaloosa, AL 35403-2086

Re: Claim of Abdul Jibril under Home Insurance

Policy No. GLRF720982

Dear Walter:

Enclosed is the claim we discussed yesterday. Mr. Jibril claims to have experienced allergic reactions to some Phiferglass SunScreen that was installed in the apartment he rented prior to May 8, 1993. It appears Mr. Jibril is demanding only reimbursement of two medical bills which total \$546.48 and an additional \$300 to compensate him for 60 hours of work missed due to the alleged illness that resulted from exposure to our product. It is my understanding that he has agreed to settle this claim for a total of \$846.48.

I suggest you forward this claim directly to Mr. Roger Stark at the Home Insurance Company, P. O. Box 945990, Maitland, FL 32794-5990. Mr. Stark is adjusting the claim of Diane Geryk (that is the one from Massachusetts that came in 4/20/93) and he will probably handle the Claudia Fullerton claim which I forwarded to you at the first of May. If you need to speak with Mr. Stark, his telephone number is 800-877-8547 extension 165.

Sincerely yours,

PHIFER WIRE PRODUCTS, INC.

Charles Morgan

CM:jh

Enclosure

Founded 1952 By REESE PHIFER

PHONE 205/345-2120 • FAX 205/759-4450 • TELEX 261326 (PHIF UR)

STATEMENT OF DR. CLIFTON D. CRUTCHFIELD

I am a Certified Industrial Hygienist affiliated with Health Effects Group, Inc. of Tucson, Arizona and employed by the University of Arizona.

In November of 1991, I was asked to research the content of emissions from PVC window screen material which I later learned was manufactured by Phifer Wire Products. Health Effects Group, Inc. is a completely independent firm and we were initially contacted and retained by an Arizona screen dealer not affiliated with Phifer Wire Products except as a customer. I submitted my report to this dealer on or about November 25, 1991. Following that report, research was done and reported by at least three other research organizations.

In February of 1993, Phifer Wire Products asked me to review my research data and the data compiled by the other three research facilities and submit an updated summary report on the possible health risk of exposure to Phifer screening. I submitted my final report on April 27, 1993. Phifer Wire authorized me to discuss my findings with any media representative or member of the general public.

In reviewing the transcripts and listening to the videotapes of recent television news broadcasts on the subject about which I conducted this research, I was surprised to hear the allegations that Phifer screening is "toxic" and that it emits "toxic gasses." I was even more surprised to learn that the stations reporting this had been provided copies of my reports and claimed to rely on those reports in reaching their conclusions. None of the research reports in question detected emissions of any substances from Phifer screening at levels considered potentially toxic. The research does not show that Phifer screening emits toxic gasses.

Clifton D. Crutchfield, Ph.D., C.I.H.

May 3, 1993

Date

STATEMENT OF DR. ROBERT G. MEEKS

I was a member of the faculty in the Department of Environmental Health Sciences at the University of Alabama School of Public Health when I supervised research on Phifer Wire Products PVC-coated fiberglass screening. I have reviewed the transcripts of recent television news broadcasts that purported to rely on my findings and conclusions in alerting their listeners to the dangers of "toxic screening" that "emits toxic gasses." The TV broadcasts inaccurately reported my findings and conclusions as well as those of other studies that were referenced in the broadcasts. I specifically advised the reporters who contacted me that it would be inaccurate to say "Phifer screens emit toxic gasses." Nevertheless, that allegation was made in the broadcast reports. My research and the in-home air testing done by Clayton Environmental detected no chemical emissions from Phifer screening at levels that could be considered toxic or hazardous.

Robert G. Meeks. Ph.D.

May 3, 1993

HEALTH EFFECTS GROUP, INC.

PC 50x 41778 Tucson, Arizona 85717 (602) 888 4442

Toxicology
Environmental Health
Industrial Hygiene

DETERMINATION OF VOLATILE EMISSIONS FROM SUNTROL WINDOW SCREEN MATERIAL

Suntrol Window Products Suite 6 3767 E. Broadway Phoenix, Arizona 85040

November 25, 1991

Clifton D. Crutchfield, Ph.D. Certified Industrial Hygienist

November 27, 1996 date

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EXECUTIVE SUMMARY

A sample of degraded PVC window screen material was submitted to Health Effects Group, Inc. for characterization of volatile organic compounds emitted from the material. Employee health related complaints are potentially associated with exposures to the emissions during handling and processing of the degraded screen material.

Volatile emissions from the screens were sampled with two different techniques and submitted for qualitative mass spectral analysis. A number of different volatile compounds were detected during analysis. The major compounds detected were several different ketones, which are generally not highly toxic but can be irritating with penetrating odors.

BACKGROUND

This analysis was generated in response to a request from John Edwards, President of Suntrol Window Products, concerning volatile emissions from degraded PVC window screens that had been installed by Suntrol. The visible degradation of installed screens was accompanied by a strong odor. Employee health complaints had been registered during removal and subsequent processing of the degraded screens.

Concern about possible adverse health effects associated with employee exposures to the volatile emissions generated the request to attempt a characterization of the emissions. It was noted during phone conversations with Mr. Edwards that the odor from the screens was more predominant during hot weather, and when large amounts of the degraded screen material were stored pending return to the manufacturer.

METHODOLOGY

Two sample panels of degraded screen material (approximately 1.5 square meters) were delivered by express carrier to the HEG office on 11-6-91. The panels was held in the carrier package at room temperature until 11-8-91, at which time approximately one-half of each panel was transferred into a 4 liter glass chamber for volatile emission sample collection. Prior to insertion of the screen samples, the glass chamber was cleaned and rinsed with distilled water.

The initial sampling strategy involved concentrating volatile emissions from the screen panels onto activated charcoal and silica gel adsorption tubes. The glass chamber was sealed with an aluminum foil cap containing three sampling ports. A glass tube was inserted through one port to the bottom of the chamber. This tube served as the source of make-up air during sample collection. The remaining two ports were used for the activated charcoal and silica gel vapor adsorption tubes used to collect volatile organic compound (VOC) emissions from the screen material.

Adsorption tube sampling was conducted outdoors to minimize potential interferences from the sample make-up air. The general air flow pattern during sampling was from the ambient environment into the bottom of the glass chamber, through the screen panels, and into the vapor adsorption tubes.

Both an activated charcoal tube (SKC 226-400/200 mg) and a silica gel tube (Supelco Orbo 53) were used for VOC adsorption. A sample flow rate of 0.6 liters/min over a sampling period of 167 minutes yielded a total sample volume of 100 liters through each adsorption tube. An identical sample collection train was used outside the glass chamber to collect simultaneous control samples of ambient air in the immediate vicinity of the sample chamber.

The sample tubes were submitted for analysis to the University of Arizona Mass Spectrometry Facility on 11/8/91. Solvent extractions of the tubes were completed using carbon disulfide (charcoal tubes) and ethanol (silica gel tubes).

A second sample collection procedure employed at the analytical laboratory involved a dynamic headspace/cryogenic trap/thermal desorption technique applied to a sample of the screen material in an attempt to enhance analytical sensitivity and to look for compounds that may have co-eluted with the sorbant tube extraction compounds. This sample was also analyzed with the gas chromatograph/mass spectrometer (GC/MS).

RESULTS AND DISCUSSION

GC/MS analysis of the charcoal and silica gel adsorption tubes showed a complex mixture of very volatile compounds which eluted early from the GC. Low levels of pthalates were also detected in the samples. Use of the cryogenic trap technique to further concentrate the early eluting volatiles revealed the major components to be four to seven carbon ketones, with methyl ethyl ketone (MEK) and methyl vinyl ketone (MVK, 3-buten-2-one) being the most abundant compounds. In addition to the ketones, other compounds detected at low levels included aliphatic hydrocarbons, aldehydes, trimethylsilanol, and benzene.

Pthalates are widely used as plasticizers. Physically, pthalates tend to be stable compounds with very low vapor pressures. Physiologically, pthalates represent one of the lowest toxicity classes used in industry. They have generally also exhibited a low order of toxicity in experimental animals.

As a class, the ketones tend to be volatile liquids with characteristic odors. At concentrations greater than 300 ppm (parts per million parts air), methyl ethyl ketone has been found to be irritating to the eyes, nose, and throat. It is also capable of causing nausea at such concentrations. No permanent adverse effects have been noted following exposures to MEK of over 700 ppm. The current threshold limit value for mean 8-hour exposures to MEK is 200 ppm; the short term exposure limit for 15 min. periods is 300 ppm.

Higher order ketones such as MVK tend to be more irritating and have more penetrating odors. MVK has been characterized as having a powerfully irritating odor. Threshold limit values have not been established for MVK.



CONCLUSIONS

Gas chromatographic/mass spectral analysis showed that the primary volatile emissions detected in the head space of degraded PVC screen material were ketones, with methyl ethyl ketone and methyl vinyl ketone being the most predominant. While these compounds do not appear to be acutely toxic, they can be skin and respiratory system irritants with powerfully penetrating odors.

In the absence of information on actual exposure levels to these compounds during handling and processing of the degraded screen material, precautions to preclude excessive skin and respiratory exposures should be taken.

HEALTH EFFECTS GROUP, INC.

P.O. Box 41778 Tucson, Arizona 85717 (602) 883-4442

Toxicology Environmental Health Industrial Hygiene

A Review of Environmental Sample Results from Homes Studied in the Overland Trail Phase III Project Conducted by the Arizona Department of Environmental Quality

Submitted by:

Clifton D. Crutchfield, Ph.D. Certified Industrial Hygienist

May 14, 1993



INTRODUCTION

The following analysis was conducted at the request of Mr. Charles Morgan, Executive Vice President of Phifer Wire Products, Inc., P.O. Box 1700, Tuscaloosa, AL. In response to the request, an analysis has been made of environmental sampling results from six homes that were monitored during the Overland Trail Phase III Sampling Project conducted by the Arizona Department of Environmental Quality (ADEQ). This analysis was based upon data contained in reports provided by ADEQ to the owners of the homes monitored during the study.

METHODS

The ADEQ sampling project was not conducted to specifically identify the presence or magnitude of compounds that have been associated with polymer coated fiberglass sun screening material. However, the methodologies used in the study were such that, if such compounds were present in the air sampled in the homes, they should have been detected during the subsequent analysis of the samples that were collected.

Two general classes of compounds of interest were analyzed and reported by ADEQ. The first class included volatile organic compounds, of which several solvents (eg. methylene chloride, 1,1,1-trichloroethane, toluene, xylenes) were detected at parts per billion (ppb) levels. Similar solvent compounds were detected at similarly low levels in homes with screening material installed that were monitored in Michigan and Massachusetts. As was stated in my previous summary report, these compounds are typically found in home environments and do not represent the types of compounds that were identified as off-gas products when Phifer screening materials were analyzed by three independent laboratories using GC/MS technology. In other words, it seems highly improbable that the low levels of VOC's detected during the ADEQ study originated from solar screening material.

In some of the homes, ADEQ also sampled for a second class of less volatile compounds that can be generally characterized as aldehydes, ketones, and phthalates. In general, these are the types of compounds that were most often identified as low-level emissions during direct analysis of degraded Phifer screening material. Airborne concentrations of the ketones and phthalates detected during the Overland Trail Phase III Sampling done by ADEQ are listed in Table I. Concentrations are shown in units of migrograms/cubic meter of air.

Based upon information provided to me by Phifer Wire, the homes represented in Table I by sample numbers 390 and 414 are equipped with Phifer sun screens that were installed during 1988-89. The home represented by sample number 392 does not have any sun screens installed.

CONCLUSIONS

Based upon the above information, two conclusions can be drawn from the ADEQ information contained in Table I. First, the compounds listed were measured at levels ranging from <u>very-low-to-sub part per billion</u> concentrations. As the ADEQ letters indicate, such quantities would not be expected to cause any adverse health effects from breathing the air in the homes.

The second conclusion that can be drawn from the data contained in Table I is that there do not appear to be any substantial differences in the quantities of airborne ketones or phthalates found in the homes with sun screens installed versus the home without sun screens. Although low levels of ketones and phthalates have been identified as off-gas products from degraded sun screen material, it is evident that the sun screens are not the only source of these compounds in the home environment. The wide-spread use of plastic materials in-and-around home environments would support such an observation.



Table I. Concentrations of Ketones and Phthalates Detected During Overland Trail Phase III Sampling (from Arizona Department of Environmental Quality)

	Concentration, micrograms/M ³		
Compound	Sample ^a	Sample ^b	Sample ^C
Acetone	10.7	17.0	19.2
Methyl Ethyl Ketone	2.4	4.8	3.2
Acetophenone	0.08	p_{DM}	0.09
Bis(2-ethylhexyl)phthalate	0.15	0.42	0.19
Bytyl benzyl phthalate	0.34	0.15	0.05
Di-n-phthalate	0.08	0.42	0.23
Diethylphthalate	ND	0.19	ND

a 4440 W. Topeka

b 19207 North 44th Lane c 4449 West Topeka d ND - Not Detected



Department of Environmental Health Sciences

February 21, 1992

Mr. Anthony Gamble
Phifer Wire Products, Inc.
P.O. Box 1700
Tuscaloosa, AL 35403-1700

Dear Anthony:

We have essentially completed our assessment of the source of the odors associated with the polymer coated fiberglass screening material you recently sent to us.

In order to qualitatively describe the odors believed to be originating from the polymer coated fiberglass screen material, the initial studies in our laboratory utilized approximately 30 square centimeter samples of various aged and non-weathered screen material cut into 1 cm square pieces as representations of the bulk material.

These samples were introduced into glass vials and sealed with teflon crimp cap seals. The glass vials were placed in a Hewlett-Packard model 19354 Headspace Analyzer which was interfaced to a Hewlett-Packard model 5890 Gas Chromatograph using a Hewlett-Packard model 5971 Mass Spectrometer as the detector. The column in the gas chromatograph was a 25 meter HP5. The headspace sampler was set to a total carrier flow of 90 ml/min, with auxiliary pressure set at 1.4 bar. The sample loop in the headspace analyzer had a 1 ml total volume. The split ratio on the gas chromatograph was 1:4, with a column head pressure of 4 psi. The gas chromatograph was operated isothermally at 120 degrees centigrade. The mass spectrometer scanned from 30 to 500 m/z.

Headspace optimization included sampling a mixed composite of aged and non-weathered samples of screen material at temperatures ranging from 50 degrees centigrade to 120 degrees centigrade. It was found that peak height of compounds originating from these samples increased with temperature until 110 degrees. At temperatures higher than this a broad non-specific peak appeared indicating possible degradation of the polymer material.

Analyses carried out on aged and non-weathered samples presented evidence that release of compounds from the samples increases with

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weathering. That is, weathered samples produced peak heights 10 - 200 times larger than non-weathered samples.

In these initial studies, the peaks from the gas chromatograph of these materials exhibited very low retention times indicating low mass, low boiling point, and possibly polar materials. Also, the peak areas were too small to obtain reliable mass spectral identification. However, comparison of these mass spectra with NBS standards indicated the following compounds as tentatively identified:

COMPOUND	CAS #
Ethanone, 1-cyclobutyl- 3-octen-2-one, 7-methyl- 1-Butanol, 3-methyl-, acetate 2H-Pyran, 3,4-dihydro-6-methyl [2,2'-Bifuran]-5,5'-dicarboxylic acid, 4 Propanamide, 2-methyl-	3019258 33046810 123922 16015115 5905033 563837
1,2-Benzenedicarboxylic acids: diisooctyl 3-nitro diundecyl diisodecyl diheptyl	27554263 603112 3648202 26761400 3648213
Aspidofractinine-3-methanol, (2.alpha.3	2656442

These compounds would appear to be oxidation products of monomer material coated onto the fiberglass screen, various phthalates associated with plasticizers used in the manufacture of the polymer, and pigment used in coloring the screen material.

It cannot be overstressed that these were initial studies and were only tentative identifications. In order to further characterize material believed to be released from vinyl coated screens we installed a 3 ml sample loop on a Hewlett-Packard Headspace sampler interfaced to a Hewlett-Packard 5890 Gas Chromatograph using a Hewlett-Packard 5970 Mass Spectrometer as the detector, and we installed a more polar column.

Two studies have been completed with this new configuration, specifically, a temperature study and a series of analyses of vinyl coated screen materials. Conditions for the studies were as follows:

The headspace sampler bath was set at a series of temperatures ranging from 100 to 140 degrees centigrade. Samples were analyzed at 100, 110, 120, 130, and 140 degrees centigrade. Auxiliary flow was set to 1 bar pressure as was the carrier gas. This resulted in a flow of 80 ml/min to the gas chromatograph.